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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER	
ZAMAN, FAISAL M	
ART UNIT	**PAPER NUMBER**
2111	

DATE MAILED: 10/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/796,350	NALAWADI ET AL.	
	Examiner	Art Unit	
	Faisal Zaman	2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 17 and 19** are rejected under 35 U.S.C. 102(b) as being anticipated by Stanley (U.S. Patent No. 6,219,742).

Regarding Claim 17, Stanley discloses a system (Figure 1) comprising:

A processor (Column 19, line 18);

A memory device coupled to the processor (Column 19, lines 23-30);

An advanced configuration and power interface (ACPI) module to manage power management resources (Figure 1, items 110-116, Column 4, lines 30-40); and

An operating system module executed by the processor to identify a system resource that generates an interrupt and register a device driver to manage the system resource, the operating system module invoking the ACPI module when a memory access is received that corresponds to an address range registered by the device driver (Column 11, lines 12-15 and 32-37).

Regarding Claim 19, Stanley discloses wherein the address range is a system memory address range (Column 10 line 63 – Column 11 line 4).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1, 2, and 4** are rejected under 35 U.S.C. 102(b) as being unpatentable over Marisetty (U.S. Patent No. 5,590,312) in view of Carpenter et al. ("Carpenter") (U.S. Patent No. 6,148,361).

Regarding Claim 1, Marisetty discloses a method comprising:

Assigning an address range to a resource (Marisetty, Column 7, lines 39-42);

Configuring the resource by the operating system to access the address range (Marisetty, Column 7, lines 45-49 and lines 55-56); and

Generating the interrupt if the address range is accessed (Marisetty, Column 7, lines 45-49).

Marisetty does not expressly disclose identifying a resource in a computer system that is capable of generating an interrupt.

In the same field of endeavor (e.g. an interrupt architecture for a data processing system), Carpenter teaches identifying a resource in a computer system that is capable of generating an interrupt (Carpenter, Figure 7, item 302, Column 13, lines 6-9).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Carpenter's teachings of an interrupt

architecture for a data processing system with the teachings of Marisetty, for the purpose of providing an interrupt handling mechanism in a computer system that provides efficient mechanisms for interrupt routing and communication (see Carpenter, Column 1, lines 51-54). Further, it would be obvious to one of ordinary skill in the art to combine for the purpose of improved task management (by knowing exactly which and how many resources can generate interrupts) in the system of Marisetty.

Regarding Claims 2 and 4, Marisetty discloses wherein the address range is an input output address ranges and system memory address range (Marisetty, Column 7, lines 39-42).

Claim Rejections - 35 USC § 103

5. **Claims 3, 5-6, and 11-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Marisetty in view of Carpenter (hereafter referred to as "Marisetty-Carpenter"), and further in view of Stanley.

Regarding Claim 3, Marisetty-Carpenter discloses the method of Claim 1 as discussed above. Marisetty does not expressly disclose the method further comprising correlating an advanced configuration and power interface source language code method with an address range.

In the same field of endeavor (e.g. software control of hardware in a computer system), Stanley teaches correlating an advanced configuration and power interface

source language code method with an address range (Stanley, Column 4, lines 44-52, ie. the addresses of the register blocks).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Stanley's teachings of software control of hardware in a computer system with the teachings of Marisetty-Carpenter, for the purpose of having software assisted solutions to hardware-related problems in order to mitigate risk (see Stanley, Column 3, lines 1-3). Marisetty-Carpenter also provides motivation to combine by stating it is an object of the invention to provide software emulation in place of unavailable hardware in order to use less circuitry (see Marisetty, Column 2, lines 46-49).

Regarding Claim 5, Stanley discloses the following limitation, which Marisetty-Carpenter does not expressly disclose:

Correlating a system control interrupt with an advanced configuration and power interface source language code method (Stanley, Column 1 line 64 – Column 2 line 6, and Column 5, lines 38-46, an ASL code method is used when the system is in ACPI mode [see Column 4, lines 23-27]).

The motivation used in the combination of Claim 3, super, applies equally as well to Claim 5.

Regarding Claim 6, Stanley discloses the following limitation, which Marisetty-Carpenter does not expressly disclose:

Registering a device driver for the address range by the operating system (Stanley, Column 10, lines 25-44).

The motivation used in the combination of Claim 3, super, applies equally as well to Claim 6.

Claims 11-13 are directed to an apparatus of the method of Claims 1-6. Marisetty, Carpenter, and Stanley teach, either alone or in combination as stated above, the method as set forth in Claims 1-6. Therefore, Marisetty, Carpenter, and Stanley also teach, either alone or in combination as stated above, an apparatus as set forth in Claims 11-13.

Claim Rejections - 35 USC § 103

6. **Claims 7-10, 14-16, 18, and 20-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Marisetty in view of Stanley.

Regarding Claim 7, Marisetty discloses a method comprising:

Receiving an interrupt from an address access request (Marisetty, Column 8, lines 5-9); and

Invoking code assigned to the address access request (Marisetty, Column 8, lines 13-16).

Marisetty does not expressly disclose determining the source of the interrupt based on the address access request at an operating system level; and

Invoking an advanced configuration and power interface source language (ASL) code to the address access request.

In the same field of endeavor, Stanley teaches determining the source of the interrupt based on the address access request at an operating system level (Stanley, Column 11, lines 12-15); and

Invoking an advanced configuration and power interface source language (ASL) code to an address access request (Stanley, Column 11, lines 5-65, it is well known in the art that a control method is written in ACPI Machine Language, which is a low-level version of ASL, as evidenced by the ACPI Specification pages 13 and 14, cited below under Relevant Art).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined Stanley's teachings of software control of hardware in a computer system with the teachings of Marisetty, for the purpose of having software assisted solutions to hardware-related problems in order to mitigate risk (see Stanley, Column 3, lines 1-3). Marisetty also provides motivation to combine by stating it is an object of the invention to provide software emulation in place of unavailable hardware in order to use less circuitry (see Marisetty, Column 2, lines 46-49).

Regarding Claim 8, Stanley teaches notifying a source of the address access that the ASL code (ie. the control method) completed (Stanley, Column 11, lines 33-37).

Regarding Claims 9 and 10, Marisetty discloses wherein the address access request is an input output address request and wherein the address access request is a system memory address request (Column 7, lines 39-42).

Regarding Claim 14, Marisetty discloses a device comprising:

A code segment to handle a request of a resource (Marisetty, Column 8, lines 5-9, ie. the code located within the I/O controller 404);

An address protection module to manage the protection of an address space (Marisetty, Column 8, lines 9-11, the I/O trap logic 408); and

Marisetty does not expressly disclose an operating system level interrupt handler module to receive an interrupt when the address protection module detects an address space access and to invoke the ASL code segment corresponding to the address space access;

Wherein the code segment used to handle a request of a resource is an advanced configuration and power interface source language (ASL) code segment; and

The code segment that is invoked is an ASL code segment.

In the same field of endeavor, Stanley teaches an advanced configuration and power interface source language (ASL) code segment to handle a request of a resource (Stanley, Column 11, lines 5-65); and

An operating system level interrupt handler module to receive an interrupt when a module detects an address space access and to invoke the ASL code segment

corresponding to the address space access (Stanley, Column 11, lines 5-65, ie. the General Purpose Event handler).

The motivation used in the combination of Claim 7, super, applies equally as well to Claim 14.

Regarding Claim 15, Marisetty discloses wherein the address protection module is an input output protection module that generates a general protection fault (Marisetty, Column 8, lines 5-16, it is well known in the art that a general protection fault is an interrupt [or exception] that is initiated when a device attempts to access a protected I/O address).

Regarding Claim 16, Marisetty discloses wherein the address protection module is a memory protection module that generates a page fault (Marisetty, Column 7, lines 54-63, it is well known in the art that a page fault is an interrupt [or exception] that is initiated when a device attempts to access a protected system memory address).

Regarding Claim 18, Marisetty teaches wherein the address range is an input output address range (Marisetty, Column 7, lines 39-42).

The motivation utilized in the combination of Claim 7, super, applies equally as well to Claim 18.

Claims 20-23 are directed to a machine readable medium containing instructions to execute the method of Claims 7-10. Marisetty and Stanley teach, either alone or in combination as stated above, the method as set forth in Claims 7-10. Therefore, Marisetty and Stanley also teach, either alone or in combination as stated above, a machine readable medium as set forth in Claims 20-23.

Relevant Art

7. The Advanced Configuration and Power Interface Specification, Revision 2.0b, October 11, 2002 is cited as Relevant Art.

8. Operating System, Wikipedia.org, retrieved from the Internet on 7/24/06 at <http://en.wikipedia.org/wiki/Operating_system> is cited as Relevant Art.

Response to Arguments

9. Applicant's arguments filed 10/10/2006 concerning Claim 17 have been fully considered but they are not persuasive. Applicant argues that Stanley does not teach "an operating system module that identifies such system resources that generate interrupts and then registering a device driver to manage those system resources." Contrary to Applicant's argument, Stanley does in fact teach an operating system module executed by the processor to identify a system resource that generates an interrupt and register a device driver to manage a system resource (Column 11, lines 12-15), the operating system module (e.g. the General Purpose Event handler) invoking the ACPI module (ie. the module executing the control method) when a memory access

is received that corresponds to an address range registered by the device driver. The GPE handler "determines which device object (e.g. system resource) has signaled the event" (and in turn the System Control Interrupt, see Column 11, lines 7-8). Stanley also clearly indicates that a device driver is registered with the system resource by the operating system, see Column 11, lines 37-39, where it states "[t]he native OS driver is then notified that *its* device [e.g. system resource] has asserted wake...". Therefore, Claim 17 stands as previously rejected.

10. Applicant's argument filed 10/10/2006 with regards to Claim 1 (and similarly Claim 11) and the limitation "configuring the resource by the operating system to access the address range" has been fully considered but it is not persuasive. Contrary to Applicant's argument, Marisetty does in fact teach this limitation. The step of the resource (ie. the application) accessing the address range (see Marisetty, Column 7, lines 45-49 and lines 55-56) is equivalent to "configuring the resource to access the address range". To further clarify, since the resource (e.g. the application) performs it's functions under the control of the operating system (see Marisetty, Column 6, lines 58-61), it is understood that the operating system is the component that actively configures the application to access the address range, as described in Column 7 lines 45-49 and lines 55-56. Further, Marisetty teaches that a memory address range and an I/O memory range are both set up for VGA accesses in on-board memory 408. It is well known in the art that operating systems (for example, Figure 3B, item 311 of Marisetty) are responsible for setting up the memory allocations of the various devices operating in the computer system, as evidenced by "Operating System", Wikipedia.org (see lines 1-

3), cited above under Relevant Art. In response to Applicant's argument in regards to the Wikipedia.org article excerpt that "the memory allocation referred to is the memory management further discussed on page 2, where the OS manages system memory allotted to running applications", the examiner disagrees. Firstly, the examiner believes that Applicant's statement that "the OS manages system memory allotted to running applications" contradicts Applicant's statement that "operating systems are [not] responsible for setting up the memory allocations of various devices." Further, the definition of "operating system" (see Microsoft Computing Dictionary, Fifth Edition, Page 378, "operating system") is "[t]he software that controls the allocation and usage of hardware resources such as memory,... and peripheral devices". Therefore, it can be seen that the operating system is in fact responsible for allocating portions of memory to the applications and resources running in the computer system.

11. Applicant's arguments filed 10/10/2006 with regards to Claim 7 (and similarly Claim 20) have been fully considered but they are not persuasive. Applicant argues that neither Marisetty nor Stanley teach "that the source of the interrupt is determined based on 'the address access request at an operating system level'". The examiner disagrees. Contrary to Applicant's argument, Stanley does in fact teach that the source of the interrupt is determined based on "the address access request at an operating system level", see Stanley, Column 11, lines 12-15. Stanley teaches that the General Purpose Event handler (which operates at the operating system level, see Column 11, lines 29-36) "determines which device object (e.g. system resource) has signaled the event" (and in turn the System Control Interrupt). Further, Stanley teaches that when,

for example, a process attempts to access the General Purpose Event register (bit 4 of the General Purpose Event0_STS bits [see Column 11, lines 43-44]), a System Control Interrupt is asserted (see Column 11, lines 7-8). This bit corresponds to an address in the computer's memory (see Column 10 line 63 – Column 11 line 4; ie. "base address GPE1_BASE"). In response to the System Control Interrupt being asserted, an ACPI control method is executed (see Column 11, lines 44-65). Therefore, Claim 7 stands as previously rejected.

12. Applicant's arguments filed 10/10/2006 with regards to the rejection of Claim 14 have been fully considered but they are not persuasive. Applicant argues that Stanley does not teach "that the general purpose event handler receives an interrupt from an address protection module that detects an address space access."

Firstly, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Marisetty teaches the address protection module (ie. I/O trap logic 408) as described in the rejection above. Further, Stanley teaches "an operating system level interrupt handler module to receive an interrupt when a module detects an address space access and to invoke the ASL code segment corresponding to the address space access", see Column 11 lines 5-15. Stanley teaches that when, for example, a process attempts to access the General Purpose Event register (bit 4 of the General Purpose Event0_STS events [see Column 11, lines 43-44]), a System Control Interrupt is

asserted (see Column 11, lines 7-8). This bit corresponds to an address in the computer's memory (see Column 10 line 63 – Column 11 line 4). In response to the System Control Interrupt being asserted, an ACPI control method is executed (see Column 11, lines 44-65). The GPE handler determines which device object has signaled the event based on the System Control Interrupt (SCI).

Applicant argues that "since the General Purpose Event handler corresponding to the signaled event is dispatched upon signaling of the event, the handler already knows when to identify the device object which signaled the event and perform the Notify, ie., upon dispatch." The examiner disagrees. The General Purpose Event handler is only dispatched upon receipt of an SCI, even if the SCI is received by the General Purpose Event handler through the ACPI. To further clarify, if the SCI was not generated, the GPE handler would never be dispatched, therefore the examiner maintains that the receipt of the SCI by the GPE handler (even if through the ACPI) is a critical step in order for it to know when to determine which device object signaled the event. Therefore, Claim 14 stands as previously rejected.

13. Applicant's arguments filed 10/10/2006 regarding the motivation to combine (see Page 12 of Remarks) have been fully considered but they are not persuasive. Applicant argues that the combination of the "SCI interrupt and general purpose event handler disclosed by Stanley would be inappropriate as this would not allow the emulation program of Marisetty to operate transparent to the operating system and, therefore, render it unsuitable for its intended purpose." The examiner disagrees. Contrary to Applicant's argument, Stanley teaches that the use of an SMI interrupt (an OS-

transparent interrupt) can be used in the system of Stanley if a legacy OS is loaded, see Column 9, lines 11-14 and Column 10, lines 1-12.

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faisal Zaman whose telephone number is 571-272-6495. The examiner can normally be reached on Monday thru Friday, 8 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rehana Perveen can be reached on 571-272-3676. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

fmz

REHANA PERVEEN
SUPERVISORY PATENT EXAMINER
10/27/06